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NO HOME WORK FOR MATHEMATICS PUPILS

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In August, 1919, at a departmental meeting of the University High School mathematics department, I asked for permission to conduct a section of first year pupils without assigning them homework. Permission was granted and the idea was carried out in all the freshmen mathematics classes.

My request was based upon the fact that for several years I had taught a first-year class the first hour after luncheon, 1:05 to 1:55. The class of this period had worked with enthusiasm and success. The pupils felt refreshed and I could generally put over any topic I cared to present. Their attack was so vigorous that I could teach a new topic, give them opportunity for questions and additional explanations, and get them prepared for doing homework successfully.

Then next day the homework came in nearly all perfectly done. But that did not necessarily mean that each pupil had done the work unaided. My pupils came from homes of teachers and frequently from homes provided with tutors. So I decided that the only true check I had on what they could do unaided was from what they did in the class room. For this reason I felt that the outside work had little real value to me as a teacher and could be dispensed with without loss. Then, too, as a parent of two girls in another high school, I knew that the teachers in the subjects other than mathematics would give enough homework to keep the freshmen busy, and, perhaps, the parents, too, if they attempted to supervise the home preparation.

A second consideration that led me to desire the undertaking lay in ten years' experience in teaching a general introduction to mathematics, covering arithmetic, geometry, algebra, and trigonometry, along fusion lines rather than in tandem fashion. I had learned to illustrate one topic by means of another. I could present a new idea in several forms and illustrate it from different fields of mathematics. This had pleased me and the pleasure seemed to pass over to the pupils. They got the notion that more and more powerful methods of solutions were coming and that eventually we would command means of dealing with almost any kind of a mathematical situation.

In conducting the class I said nothing about not going to give them homework. My plan was to teach a topic, make every effort to present it clearly, and to invite questions about anything not understood. Questions about the topic came only from the better part of the class until after the class has been set to applying the new idea. Then the poorer half discovers that it lacks full knowledge. After sufficient explanation and practice had been given, I had a tryout.

My tryout consisted of selecting a number of type exercises that embodied the principle taught but had increasing difficulties in solution. For instance, in equations with two unknowns, I chose these exercises:

1. $6a - 4b = 2.$ 2. $\frac{2h}{7} + \frac{5k}{2} = 33$
$5a + 7b = 43.$ $\frac{3h}{4} - \frac{2k}{5} = 17$

3. With two parallels, the interior angles on the same side of a transversal are $(14x - y)^\circ$ and $(6x + y)^\circ$ and their difference is 14°. Find x, y, and all the eight angles.

4. The areas of two triangles having equal bases are 72 sq. in. and 60 sq. in. Twice the altitude of the first, plus 3 times the altitude of the second is equal to 54 in. Find the altitudes.

5. A man gained 8% on one investment and lost 3% on another. If the money invested amounted to $22,000 and the net gain was $440, what was the amount of each investment?

These examples were taken from Breslich's *First Year Mathematics* and the page and number of each was written on the board. Then I sat at my desk and passed judgment on each solution as each pupil completed and handed it to me. No pupil attempted the second problem until he had done the preceding one correctly. In some instances, a pupil spent fifty minutes trying to get the first of a set done correctly, and failed. On the same occasion other pupils would do two, three, four, five, or more correctly. If the day's work for the set was unsatisfactory, the next day was spent in more instruction and practice, and the third day a second test was given.

I continued this method of *teaching* and *testing* with every topic I wanted thoroughly comprehended.

The foregoing description applies to the year 1919-1920. This year, 1920-1921, I am continuing to omit homework entirely from first-year mathematics classes and also almost wholly from second- and third-year classes.

In addition to reducing the time for required work on mathematics to the fifty-minute class room period five times a week, our entire department with 350 pupils and four teachers is working to increase the per cent. of efficiency of our pupils. Our motto is "Teach, Test, and Teach Again." The standard set is 80 to 90 per cent. for every pupil. Those not attaining the standard are taught the topic a second, a third, or a fourth time, or until the principle has been mastered for the time, at least.

A list of excess credit topics has been posted for pupils desiring to do more than the minimum essentials for credit. Besides this class periods have provisions within the hour for the better groups within each class. For instance, while one part of a third-year class takes supplemental instruction and does more assimilative exercises, the stronger part does the parallel part of the Board examinations for several years.

Unless the teacher is a parent, he seldom realizes the hours the pupils struggle over the home assignments each year. Time is thus spent that could be employed in reading, acquiring musical skill, becoming adept in the duties of the home, enjoying the social life of the family, participating in some of the community activities, and best of all, a few additional hours of sleep.

Factors which make for better instruction through the use of this teaching method are: a more careful selection of topics for consideration; a discarding of considerable irrelevant material; an intimate acquaintance with each pupil's difficulties; a complete control of the learning processes; and a more intense working class period.

In the freshman class, which I mention in my first paragraph, only two out of twenty-six failed to pass the first semester of the second-year course, although the class had been distributed and came under different instructors.